CLAIMS

What is claimed is:

1. A method for gating image data, comprising the steps of:

acquiring a set of motion data during a breath hold;

deriving one or more attributes of motion from the set of motion data;

deriving an initiation threshold and a termination threshold from the one or more attributes; and

generating a set of gated image data using one or more gating intervals derived from the initiation threshold and the termination threshold.

2. The method as recited in claim 1, wherein acquiring the set of motion data comprises acquiring the set of motion data from at least one of a set of pre-acquisition image data, a set of image data, and one or more sets of sensor data.

3. The method as recited in claim 1, wherein acquiring the set of motion data comprises measuring at least one of a displacement, a pressure, an acceleration, a velocity, and a pressure via one or more non-electrical sensors.

4. The method as recited in claims 1, wherein acquiring the set of motion data comprises measuring at least one of an electrical activity indicating a muscular contraction and a change in electrical impedance via two or more electrical sensors.

5. The method as recited in claim 1, wherein generating the set of gated image data comprises acquiring the set of gated image data using an imaging system such that acquisition begins when a first measurement of motion decreases below the initiation threshold and acquisition ceases when a second measurement of motion increase above the termination threshold.

6. The method as recited in claim 1, wherein generating the set of gated image data comprises selecting the set of gated image data from a set of image data such that selection begins when a first measurement of motion decreases below the initiation threshold and selection ceases when a second measurement of motion increase above the termination threshold, wherein the first and second measurement of motion are acquired concurrently with the image data.

7. The method as recited in claim 1, wherein the initiation threshold corresponds to the beginning of the breath-hold and the termination threshold corresponds to the cessation of the breath-hold.

8. The method as recited in claim 1, wherein the initiation threshold corresponds to the beginning of a quiet period within the breath hold and the termination threshold corresponds to the end of the quiet period.

9. The method as recited in claim 1, further comprising the steps of:

displaying at least one of the set of motion data, the one or more attributes, the initiation and termination thresholds, and the one or more suggested gating intervals;

determining if at least one of the initiation and termination thresholds and the one or more suggested gating intervals are acceptable; and

replacing at least one of the initiation and termination thresholds and the one or more suggested gating intervals if they are determined to be unacceptable.

10. The method as recited in claim 1, wherein generating the set of gated image data comprises:

determining if one or more scan parameters are satisfied; and

acquiring the set of gated image data if the one or more scan parameters are satisfied.

11. The method as recited in claim 10, further comprising the step of generating a notification if the one or more scan parameters are not satisfied.

12. The method as recited in claim 1, further comprising the step of providing a notification to at least one of a patient and an operator indicating a breath hold status.

13. A computer program, provided on one or more computer readable media, for gating image data, comprising:

a routine for acquiring a set of motion data during a breath hold;

a routine for deriving one or more attributes of motion from the set of motion data;

a routine for deriving an initiation threshold and a termination threshold from the one or more attributes; and

a routine for generating a set of gated image data using the initiation threshold and the termination threshold

14. The computer program as recited in claim 13, wherein the routine for acquiring acquires the set of motion data from at least one of a set of pre-acquisition image data, a set of image data, and one or more sets of sensor data.

15. The computer program as recited in claim 13, wherein the routine for acquiring measures at least one of a displacement, a pressure, an acceleration, a velocity, and a pressure via one or more non-electrical sensors.

16. The computer program as recited in claim 13, wherein the routine for acquiring measures at least one of an electrical activity indicating a muscular contraction and a change in electrical impedance via two or more electrical sensors.

17. The computer program as recited in claim 13, wherein the routine for generating acquires the set of gated image data using an imaging system such that acquisition begins when a first measurement of motion decreases below the initiation threshold and acquisition ceases when a second measurement of motion increase above the termination threshold.

18. The computer program as recited in claim 13, wherein the routine for generating selects the set of gated image data from a set of image data such that selection begins when a first measurement of motion decreases below the initiation threshold and selection ceases when a second measurement of motion increase above the termination threshold, wherein the first and second measurement of motion are acquired concurrently with the image data.

19. The computer program as recited in claim 13, wherein the initiation threshold corresponds to the beginning of the breath-hold and the termination threshold corresponds to the cessation of the breath-hold.

20. The computer program as recited in claim 13, wherein the initiation threshold corresponds to the beginning of a quiet period within the breath hold and the termination threshold corresponds to the end of the quiet period.

21. The computer program as recited in claim 13, further comprising:

a routine for displaying at least one of the set of motion data, the one or more attributes, the initiation and termination thresholds, and the one or more suggested gating intervals; and

a routine for replacing at least one of the initiation and termination thresholds and the one or more suggested gating intervals if they are determined to be unacceptable.

22. The computer program as recited in claim 13, wherein the routine for generating determines if one or more scan parameters are satisfied and acquires the set of gated image data if the one or more scan parameters are satisfied.

23. The computer program as recited in claim 22, comprising a routine for generating a notification if the one or more scan parameters are not satisfied.

24. The computer program as recited in claim 13, comprising a routine for providing a notification to at least one of a patient and an operator indicating a breath hold status.

25. An imaging system comprising,

an imager configured to generate a plurality of signals representative of one or more structures within a region of interest;

data acquisition circuitry configured to acquire the plurality of signals;

data processing circuitry configured to process the plurality of signals;

system control circuitry configured to operate at least one of the imager and the data acquisition circuitry and to generate a set of gated image data from the plurality of signals using one or more gating intervals, wherein the one or more gating intervals are derived from an initiation threshold and a termination threshold, wherein the initiation threshold and the termination threshold are derived from one or more motion attributes derived from a set of motion data acquired during a breath hold; and

an operator workstation configured to communicate with the system control circuitry and to display one or more images generated from the gated image data.

26. The imaging system as recited in claim 25, further comprising a sensor-based motion determination system configured to acquire the set of motion data.

27. The imaging system as recited in claim 26, wherein the sensor-based motion determination system measures electrical attributes of one or more organs.

28. The imaging system as recited in claim 26, wherein the sensor-based motion determination system measures non-electrical attributes of one or more organs.

29. The imaging system as recited in claim 28, wherein one or more non-electrical sensors of the sensor-based motion determination system comprise accelerometers, optical markers, displacement sensors, force sensors, ultrasonic sensors, strain gauges, photodiodes, and pressure sensors.

30. The imaging system as recited in claim 25, wherein the system control circuitry generates the set of gated image data by activating at least one of the imager and the data acquisition circuitry based upon the one or more gating intervals.

31. The imaging system as recited in claim 25, wherein the system control circuitry generates the set of gated image data by selectively processing the plurality of signals based upon the one or more gating intervals.

32. The imaging system as recited in claim 25, further comprising a feedback device configured to notify at least one of a patient and an operator of a breath hold status of the patient based upon data from at least one of a sensor-based motion determination system, the data processing circuitry, and the system control circuitry.

33. The imaging system as recited in claim 32, wherein the feedback device comprises a visual display device configured to display at least one of one or more colors, one or more symbols, and one or more textual messages.

34. The imaging system as recited in claim 32, wherein the feedback device comprises an audible notification device configured to play at least one of one or more tones and one or more audible messages.

35. An imaging system, comprising:

means for acquiring a set of motion data during a breath hold;

means for deriving one or more attributes of motion from the set of respiratory motion data;

means for deriving an initiation threshold and a termination threshold from the one or more attributes; and

means for generating a set of gated image data using one or more gating intervals derived from the initiation threshold and the termination threshold.